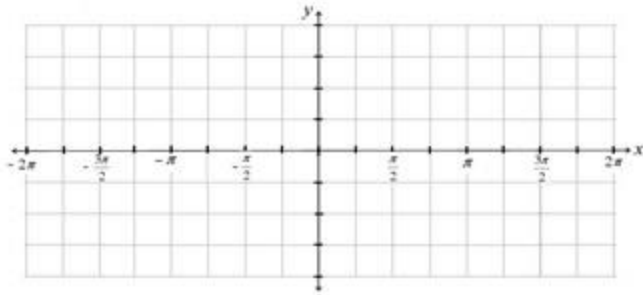


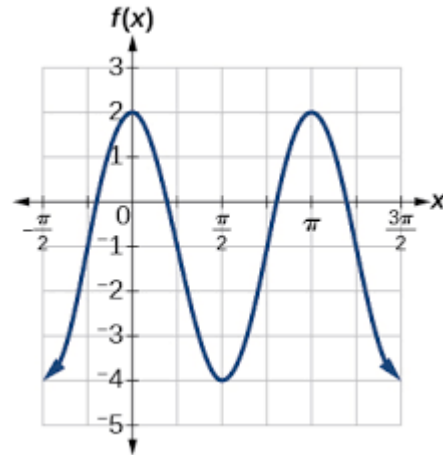
## Unit 7/8 Review: Trigonometric Functions and Statistics

### Trig graphs:

1. Consider the function:  $f(x) = -2 \sin 4(x + \pi)$ 
  - a. What will the amplitude of the graph be?  
Explain how you know.
  - b. What will the period of the graph be? Explain how you know.
  - c. What will the translation(s) of the graph be?  
Explain how you know.
  - d. Graph the function

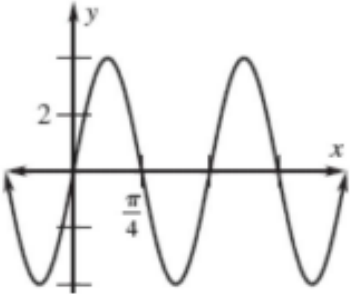
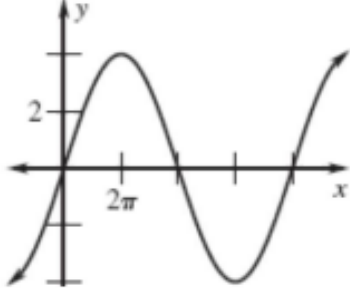
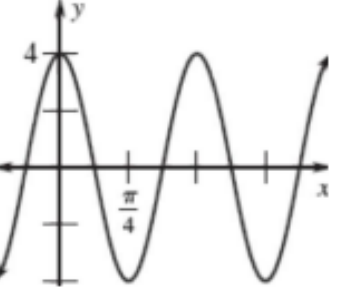
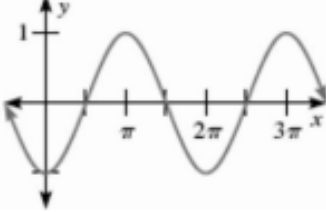
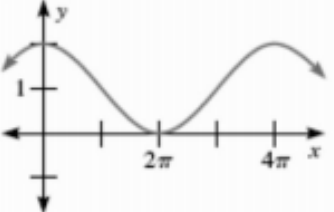
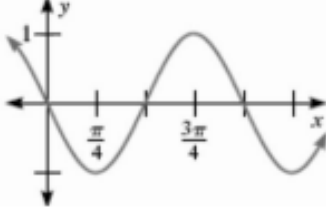
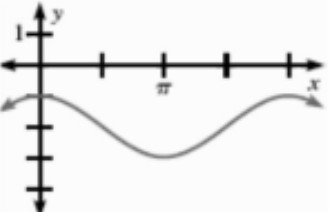


2. Consider the graph:



- a. What will the amplitude of the graph be?  
Explain how you know.
- b. What will the period of the graph be? Explain how you know.
- c. What will the vertical translation of the graph be? Explain how you know.
- d. Is this a sine or cosine function? Explain how you know.
- e. Write the equation of the graphed function.

3. Match the graph with its equation. Explain how you made your decision.

$y = 4 \sin 4x$ _____	<b>A.</b> 	<b>B.</b> 
$y = \cos(x + \pi)$ _____	<b>C.</b> 	<b>D.</b> 
$y = 4 \cos 4x$ _____	<b>E.</b> 	<b>F.</b> 
$y = 4 \sin \frac{1}{4}x$ _____	<b>G.</b> 	
$y = \sin 2\left(x + \frac{\pi}{2}\right)$ _____		
$y = \cos x - 2$ _____		
$y = \cos \frac{1}{2}x + 1$ _____		

4. If  $\sin(\theta) = -1/4$  and  $\theta$  is in the 3rd quadrant, find  $\cos(\theta)$ .

5. Find the coordinates of the point on a circle with radius 30 corresponding to an angle of  $170^\circ$

## Statistics:

6. A reporter wants to know the percentage of voters in the state who support building a new highway. What is the reporter's population?
  - a. the number of people who live in the state
  - b. the people who were interviewed in the state
  - c. all voters over 25 years old in the state
  - d. all eligible voters in the state
7. The owner of a nationwide chain of shopping malls is interested in the buying habits, on any given day, of the people who shop at the malls. Which sentence describes the best sample the owner could use to make inferences about the population?
  - a. Choose one shopping mall from the chain and survey all the people who shop there every day of the week.
  - b. Choose one shopping mall from the chain and survey the managers of the three largest stores about the habits of the people who shop in their stores.
  - c. Randomly select a sample of shopping malls from the chain throughout the nation and survey a random sample of the people who shop at the mall on Friday.
  - d. Randomly select a sample of shopping malls from the chain throughout the nation and survey a random sample of the people who shop at the mall each day of the week.
8. Which method would be the best way to conduct an observational study to determine the effects of vitamin C for preventing colds?
  - a. Ask 100 people who consume vitamin C if they got a cold.
  - b. Ask 100 people who had a cold last winter if they consumed vitamin C on a regular basis and record the number.
  - c. Divide 100 volunteers into two groups; one group will consume vitamin C and the other group will not consume vitamin C. After a period of time, see how many people in each group developed a cold.
  - d. Interview 100 people and classify them as either never consuming vitamin C, sometimes consuming vitamin C, or consuming vitamin C on a regular basis. Check for any cold symptoms in all the patients and analyze results.
9. A radio advertiser wishes to choose a random sample of size 100 from a population of 5,000 listeners. After observing that  $5,000 \div 50 = 100$ , he first selects a subject at random from the first 50 names in the sampling frame, and then he selects every 50th subject listed after that one. This method of random sampling is called:
  - a. Stratified random sampling.
  - b. Systematic random sampling.
  - c. Cluster random sampling.
  - d. Simple random sampling.
10. A group of researchers was interested in the effect of music on the behavior of dogs. Specifically, they wanted to measure the effect of classical music on sleepiness as an indication of dogs' mental relaxation. They conducted the following study on a group of 400 Jack Russell Terriers.

Every day for 4 months, the researchers would play Beethoven's Moonlight Sonata for 1 hour occurring randomly between 9 a.m. and 12 p.m. During the entire 3 hours, observers would record the times in which each dog was sleeping. By the end of the 4 months, the researchers calculated and compared the percentage of time each dog spent sleeping during each of two conditions: while the music was playing and while it wasn't.

- a. This is a sample survey.
- b. This is an observational study.
- c. This is an experiment.

\*\*What are some of the flaws you notice?

11. Students with similar class averages were divided into two groups of ten. Each student in one group slept for 9 hours per night for three nights. Each student in the other group slept for 8.5 hours per night for three nights. Afterward, all students were given a standardized readiness test to determine the effect of sleep on academic performance. The results of test scores are shown in the table.

Student Test Scores	
9 Hours Sleep	8.5 Hours Sleep
92	91
88	85
95	71
85	86
98	80
86	79
89	82
91	84
94	85
80	83

Which conclusion is supported by the data?

- All students who receive 9 hours of sleep will score 80 or better.
- All students who receive at least 8.5 hours of sleep will pass their tests.
- The range of scores of students who received 9 hours of sleep was 7 points more than the range of scores of students who received 8.5 hours of sleep.
- The mean score of students who received 9 hours of sleep was more than 5 points higher than those who received 8.5 hours of sleep.

(Note: margin of error  $\approx 2 \frac{s}{\sqrt{n}}$  where  $s$  is the sample standard deviation and  $n$  is the sample size.)

- Calculate the margin of error for each of the sets of data. How do they compare? Why does this make sense (or does it)?
- Now condense the data into one set. Calculate the margin of error. How did it change? Why does this make sense (or does it)?

15. A newspaper publishes a study indicating that 45% of the population likes spicy food with a margin of error of  $\pm 7\%$ . Would you conclude that most people like spicy food? Why or why not?

16. One study indicates that 80% of adults know how to swim with a margin of error of  $\pm 8\%$ . Another student claims they found that only 75% of adults know how to swim with a margin of error of  $\pm 3\%$ . Which study used the larger sample? How can you tell?